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Arterial Pseudoaneurysm Associated with Pancreas and Kidney Transplantation: A Case Report

Authors' Contribution:
Study Design A
Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
Literature Search F
Funds Collection G

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Conflict of interest: None declared

Patient: Male, 49
Final Diagnosis: Arterial pseudoaneurysm
Symptoms: Abdominal pain • fever and a pulsatile tumor located in the right iliac fossa
Medication: —
Clinical Procedure: Endovascular and surgical approach
Specialty: Transplantology

Objective: Unusual clinical course

Background: Pseudoaneurysm is a rare vascular complication in pancreas transplantation. This complication develops from a disruption of the arterial continuity, usually related to trauma, infection, vasculitis, or complications in vascular procedures.

Case Report: A 43-year-old man underwent simultaneous pancreas and kidney transplantation for end-stage renal disease. He subsequently developed acute pancreatitis and acute kidney cellular rejection as late complications, thus returning to hemodialysis. A new, uneventful kidney transplantectomy and living donor kidney transplant was performed. One year after the last transplant, the patient presented with moderate abdominal pain, fever, and a pulsatile tumor located in the right iliac fossa. A pseudoaneurysm located in the pancreatic Y graft was observed. The patient was treated using an endovascular and surgical approach.

Conclusions: A combined procedure using an endovascular and surgical approach promoted a good vascular control with a lower risk of bleeding in a rare case of pseudoaneurysm in a transplant patient.

MeSH Keywords: Aneurysm, False • Endovascular Procedures • Pancreas Transplantation

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Background

Pancreas transplantation is still the gold standard endocrine replacement treatment to safely restore normoglycemia by the provision of sufficient β cell mass and reducing the long-term complications of insulin-dependent diabetes [1].

Vascular complications are a significant cause of morbidity and mortality following organ transplantation [2]. In fact, all vascular procedures have the potential to develop pseudoaneurysm (PA) [3]. Renal transplantations have a PA rate of less than 1% [4] and orthotopic liver transplantations have a hepatic artery PA incidence of 2% [5]. However, the incidence of PA in pancreatic transplantations has been reported to be higher (8%) [6].

This type of complication develops from a disruption of the arterial continuity usually related to trauma, infection, vasculitis, or complications in vascular procedures [7]. The formation of a PA following pancreas transplantation is a rarely reported complication that can present as massive abdominal bleeding due to free rupture of the PA, or as gastrointestinal (GI) bleeding due to erosion of the PA to the GI tract, or as an asymptomatic contained PA. Reported treatment options for post-pancreatic transplantation PAs include graft resection, open vascular repair, and endovascular repair [6].

This report presents a case where there was a pancreatic graft PA with sentinel bleeding, emphasizing a successful treatment with a combined endovascular and surgical approach.

Case Report

A 43-year-old man underwent simultaneous pancreas and kidney transplantation for end-stage renal disease secondary to insulin-dependent diabetes mellitus, existing condition since the patient was a teenager. The procedure was performed at the Clinicas Hospital, University of Sao Paulo Medical School. The operation and initial post-operative time was uneventful and the patient was discharged home with normal pancreas and kidney function.

One year post-transplant, the patient had an episode of acute pancreatitis with peri-pancreatic collections evolving with endocrine pancreatic function loss. The patient became diabetic again and his glycemia was controlled by NPH insulin (20 units in the morning and 10 units at night), followed by regular human insulin, according to the finger prick glucose test. Five years post-transplant he had an acute kidney cellular rejection and renal function loss, thus returning to hemodialysis.

An uneventful kidney transplantectomy and living donor kidney transplant was performed six months later and the patient was discharged home five days after the procedure with normal kidney function without any complications.

One year after the living donor kidney transplant, the patient went back to the emergency department at the Clinicas Hospital reporting moderate abdominal pain, fever, and a pulsatile tumor located in the right iliac fossa. No hemodynamic instability was observed at that time.

A CT angiography was performed and an arterial pancreas transplant PA located in the pancreatic Y graft was observed. Associated with the PA, a peri-pancreatic collection measuring

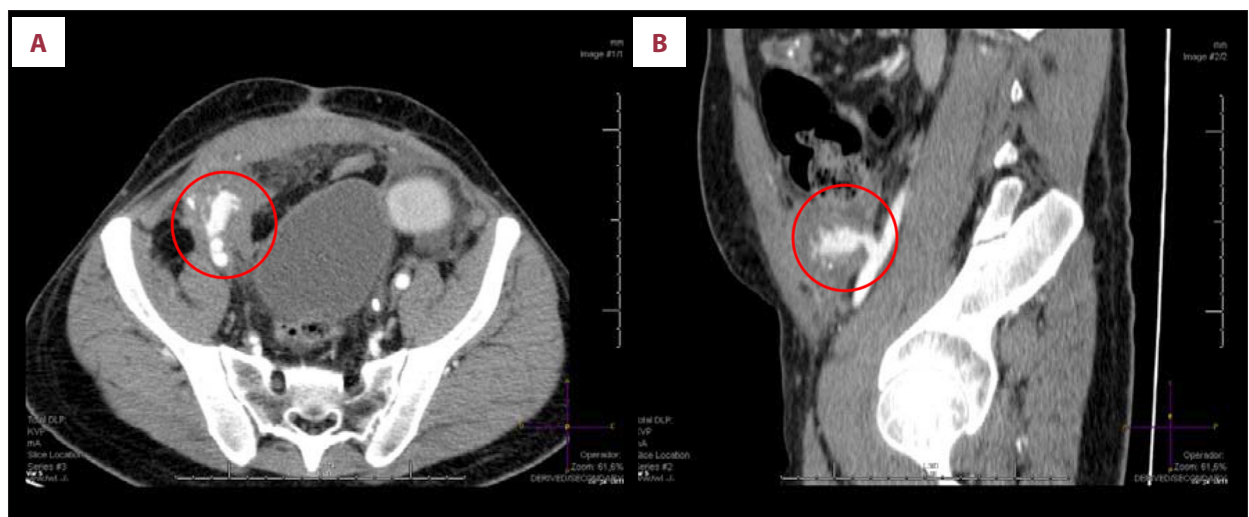


Figure 1. (A, B) CT scan showing the PA originated in the Y graft of the transplanted pancreas in the right iliac fossa, associated with a collection in the regions adjacent to the PA measuring 100 cc.

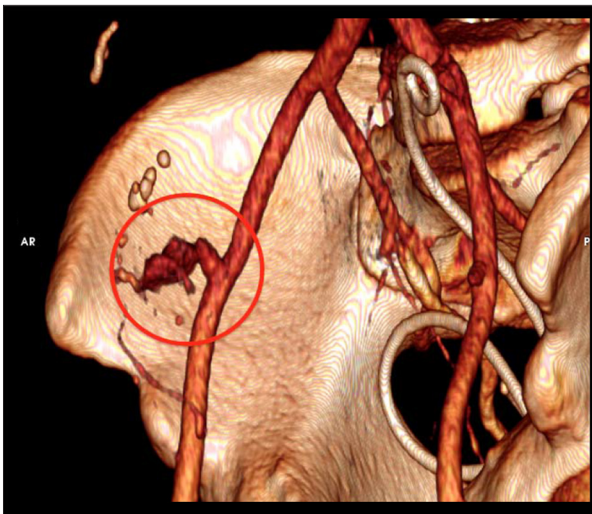


Figure 2. Three-dimensional reconstruction showing the PA origin in the Y graft of the transplanted pancreas.

6.2×3.5×9.1 cm (100 cc) was found and no enhancement in the transplanted pancreas was observed (Figures 1, 2).

We decided to use a combined endovascular and surgical approach, aiming for safety vascular control for the surgical procedure. Initially, an incision was made in the upper part of the thigh; the right femoral artery was dissected and repaired carefully, working to maintain distal vascular control of the PA. Thereafter, an endovascular prosthesis was located into the right iliac artery by using an interventional radiology approach, occluding the PA (Figure 3).

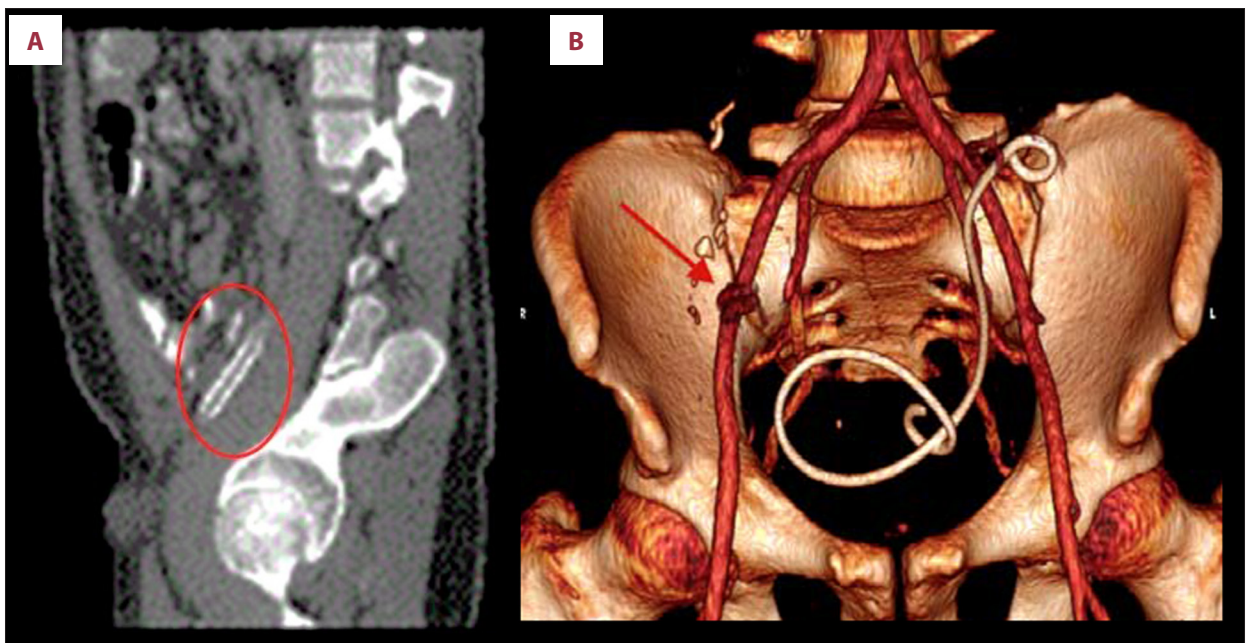


Figure 3. (A) CT angiography showing the stent into the right external iliac artery. (B) Three-dimensional reconstruction showing the PA treated.

Placing the vascular prosthesis into the right iliac artery allowed us to more easily perform procedures for vascular control and use a safety surgical approach minimizing the risk of vascular damage and bleeding, both complications quite common in this type of procedure. Pancreas transplantectomy, enterectomy, and collection wash out were performed by exploratory laparotomy at the same time as the vascular procedure without any surgical complication.

On day six post-procedure, a control CT angiography was performed and it showed the stent located inside the right external iliac artery with no more PA evidenced and a small amount of fluid in the right iliac fossa, anterior to the external iliac artery, measuring about 4.5×3.0×4.0 cm (vol: 25.0 cc). A decision was made for a conservative approach this small collection of fluid (Figure 4).

The post-operative time was uneventful and the patient was discharged home on day sixteen post-procedure, without any other complications. Nowadays, the patient is being followed in our clinic and he is asymptomatic, controlling his glycemia by insulin (NPH 6 units and regular human insulin 6 units after breakfast and after lunch, and NPH 5 units after dinner, at 10: 00 pm).

Discussion

With new advancements in immunosuppression and surgical techniques, the outcomes for patient survival and pancreas

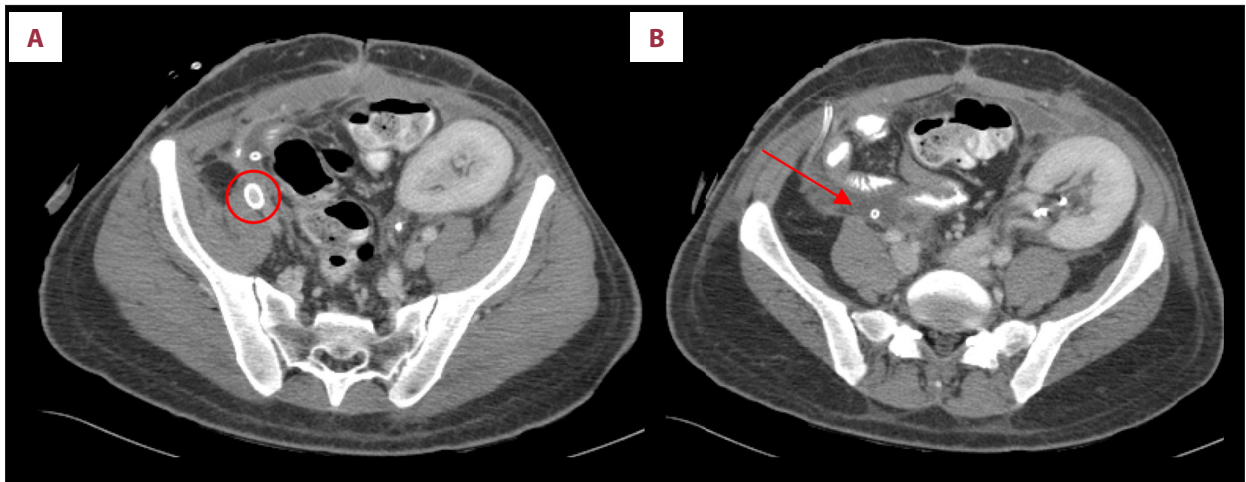


Figure 4. (A) CT angiography showing the stent into the right external iliac artery without the PA. (B) The small amount of fluid in the right iliac fossa.

Table 1. Case Reports in the literature with the diagnosis and management of aneurysms associated with pancreas transplantation.

First author (year)	n	Treatment	Graft loss
Tzakis (1989) [13]	4	Pancreatectomies	Yes
Khan (1999) [11]	1	Surgical repair	No
Madan (2001) [3]	1	Surgical repair	No
Verni (2001) [12]	1	Surgical repair	No
Green (2004) [14]	1	Endovascular and pancreatectomy	Yes
Dalla Valle (2005) [15]	1	Endovascular and pancreatectomy	No
Lubezky (2013) [6]	8	6 Pancreatectomies	Yes
		1 Endovascular	No
		1 Conservative	No
Montenovo (2014) [16]	1	Surgical repair	No

transplant graft function continue to improve even with an increasing proportion of high-risk patients and donors [7].

Among the most devastating and potentially graft- and life-threatening complications in pancreas transplantation are those involving the arterial vascular anastomosis [8]. Vascular issues may be the most challenging clinically [9]. They have various etiologies, all of which contribute substantially to transplant recipient morbidity and can result in graft loss [10,11]. Arterial and venous thrombosis, hemorrhages, and arteriovenous fistulae have been well described. However, few reports exist in the literature on the diagnosis and management of aneurysms associated with pancreas transplantation (Table 1) [12].

Arterial pancreatic PA is a potentially catastrophic complication of pancreas transplantation. The incidence has been reported

around 1.4%, with individual reports of arterial PAs and mycotic aneurysms [8]. It is often difficult to detect formation of pseudoaneurysm and/or arterioenteric fistula before developing significant hemorrhage [6,16,17].

Most of the reported PAs originate from the site of the vascular anastomosis and/or are associated with infection [2]. Regarding the clinical presentation, it can be asymptomatic or preceded by symptoms such as abdominal pain, endocrine failure, hematuria, palpable mass (usually pulsatile), hemodynamic instability, and sepsis [12,18]. It must be kept in mind that the PA, when symptomatic, generally indicates impending break, as shown in most of the cases described in the literature [12].

An arterial PA diagnostic can be made by Doppler ultrasound and confirmed by angiography to determine the origin with

higher accuracy [12]. PA is associated with a high incidence of graft loss and it contributes significantly to the morbidity associated with the procedure.

Pancreas transplant PA at the site of the iliac artery anastomosis is consistently associated with fungal infection and surgical re-exploration, with pancreatectomy usually required. However, in selected cases, performing an arterial graft transposition is possible. In this situation, it is very important to minimize as much as possible the ischemic time, aiming to preserve the pancreatic function [18].

In our case report, we chose to perform an abdomen CT scan with intravenous contrast for the diagnosis considering that the patient was hemodynamically stable and the PA diagnosis was highly suspected. The initial vascular approach by interventional radiology and endovascular stent placement followed by surgical procedure allowed us to have better initial vascular control and a safety approach to the fluid collection without any surgical complication.

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Conclusions

For early detection and preventive endovascular treatment of asymptomatic lesions, we recommend periodic screening with Doppler ultrasound of pancreatic transplantation patients, especially for those who had post-operative septic complications.

When it is feasible, combining the endovascular approach with the surgical procedure seems to be the best therapeutic option for PA associated with pancreatic graft. It provides better vascular control with a lower risk of bleeding and vascular damage, and it facilitates the identification of the lesion during the surgical approach when required.

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